From:	DeRose, Margie B -FS
To:	"Marjorie.E.Blaine@usace.army.mil"; jason_douglas@fws.gov; "jessop.carter@epa.gov"; "goforth.kathleen@epa.gov"; jean_calhoun@fws.gov; tshannon@blm.gov; Leidy, Robert; ksimms@blm.gov
Cc:	Melissa Polm; Upchurch, Jim -FS; Kingsbury, Jamie -FS; Ruyle, Jennifer -FS; Terry Chute; Chris Garrett (cgarrett@swca.com)
Subject:	Follow-up to Rosemont Informational Meeting
Date:	Tuesday, March 03, 2015 8:31:10 AM
Attachments:	image001.png image002.png image003.png image004.png

Thank you all for participating in the meeting yesterday. Hopefully Chris and Angela's presentations helped to summarize the main points in the SIR.

As discussed during the meeting, we are looking for any red-flag issues you may see in the SIR by COB this **Friday, March 6th** and any other feedback you may have by **Friday, March 20th**. Please contact me with any questions and also send your input to me.

Thank you,
Margie

Margie B. DeRose, PG
Geologist / Project Manager

Forest Service
Coronado National Forest

p: 520-388-8341
c: 5(b) (6)
mbderose@fs.fed.us

300 W Congress St, 6th Floor
Tucson, AZ 85701
www.fs.fed.us

Caring for the land and serving people

From: Chris Garrett [mailto:cgarrett@swca.com]
Sent: Sunday, March 01, 2015 7:49 PM
To: DeRose, Margie B -FS; 'Marjorie.E.Blaine@usace.army.mil'; jason_douglas@fws.gov; 'jessop.carter@epa.gov'; 'goforth.kathleen@epa.gov'; jean_calhoun@fws.gov; 'daniel_j_moore@blm.gov'; tshannon@blm.gov
Cc: Melissa Polm; Upchurch, Jim -FS; Kingsbury, Jamie -FS; Ruyle, Jennifer -FS; Terry Chute
Subject: Mon 3/2/15, Rosemont Informational Meeting

Good evening all –

The PDF of the presentation for our meeting Monday at 8:30 am will need to be downloaded due to its file size. We didn't want to risk it getting kicked out based on system limitations. In order to retrieve the documents, please follow the instructions below. Login is case-sensitive, so please enter exactly as typed below. You will see three pdfs in this file-

1. The presentation from the meeting
2. The Supplemental Information Report (SIR) which is the text of the analysis and is just over 230 pages and
3. The SIR- Appendices

Go to https://client.swca.com/
Login name: R(b) (6)
Password: D

Given that our client access server requires Java Script, and I know some of the agency computers have had problems with that, I'll attempt to send the presentation as well tonight to the EPA participants, just in case. I'll also monitor my email leading up to the meeting tomorrow, if there are any last minute problems.

- Chris

Chris Garrett, P.HGW.
Professional Hydrologist - Ground Water
Tucson Office Director (Acting)
Cell: (b) (6)
Office: (520) 325-9194


FOREST SERVICE
U S
DEPARTMENT OF AGRICULTURE


USDA

From:	Kaplan, Marc -FS
To:	Jessop, Carter
Cc:	DeRose, Margie B -FS; Hohl, Rachael -FS
Subject:	Freedom of Act Information Requests received for the Rosemont Copper SIR comments your office provided--any concerns about full release of comments?
Date:	Thursday, March 26, 2015 1:28:17 PM
Attachments:	image001.png image002.png image003.png image004.png USEPA_Comments_RosemontSIR_031815_clean.docx FOIAReqFennemoreCraigRosemontCuSIRcomments.pdf FOIAreqTDavisRosemontSIRcomments.docx

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Carter, the Coronado National Forest received two Freedom of Act requests (attached) which request a copy of each comment received on the Rosemont Copper SIR from your agency. I have attached both requests and the comments you sent via email to Margie DeRose of our office. Would you please let me know one way or the other regarding any concerns you may have of our office releasing USFWS' comments in full. If you have concerns, please be specific paragraph by paragraph. If you have no concerns, please let me know that as well. Email is fine for either response.

Thank you

Marc

Marc G Kaplan
Forest Freedom of Information Liaison

Forest Service
Coronado National Forest, Forest Supervisor's Office

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mkaplan@fs.fed.us

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DEPARTMENT OF AGRICULTURE


USDA

USEPA Comments on the March 2, 2015 Draft Rosemont Copper Project Supplemental Information Report – Provided March 18, 2015

Please note that the review time allowed for consideration of this document was relatively brief. EPA's review and comments provided below should not be assumed to include all potential concerns regarding this material, rather, they represent a best effort to provide feedback on a few key issues. Furthermore, these comments are not intended to supplant or supersede any comments made previously on these subjects.

Seep, Springs, and Riparian Areas

Overall comment: A range of model outcomes were assessed for Empire Gulch and Cienega Creek, all of which have high levels of uncertainty due to the long time frames, long distances, and relatively small amounts of drawdown involved. The effect of this uncertainty ripples through the rest of the analysis, resulting in conclusions with regard to probable outcomes that should be viewed as likewise inherently uncertain.

Pg. 37 - Analysis of Baseline Trends, Streamflow:
While some reaches show no statistically significant downward trends in streamflow, the actually trends/values should nevertheless be reported in relation to those reaches with statistically significant changes. If you have some reaches showing statistically significant trends and others that do not but are in the same trending direction, this suggests that the trends may still be biologically relevant. Aquatic organisms respond to real changes in flow and not statistical relationships. The same can be said about the precipitation trends beginning on pg. 35.

Pg. 39 - Wet/Dry Mapping:
Again, the approach downplays the ongoing observed trend in wetted stream length, citing that there is not significant statistical trend. This is misleading and may result in underestimating real impacts to aquatic organisms. For example, while a contracting wetted stream reach may show no significant statistical relationship, a contraction in a small linear distance can still have a large biological effect, especially when the available length of wetted channel is limited during the critical dry season.

Pg. 42:
"The riparian analysis relied on the following basic assumptions:

- *That the flow observed at the USGS stream gage on upper Cienega Creek during the period from 2001 to 2013 (a period of severe drought) was a reasonable representation of flow conditions in the future;*
- *That the cross-section at the gage location was similar in nature to elsewhere along upper Cienega Creek, Empire Gulch, and Gardner Canyon; and*
- *That predicted (i.e., modeled) groundwater drawdown could be superimposed directly on the historic observed stream hydrograph, and that the resulting new hydrograph could then be compared statistically with the historic observed hydrograph."* (emphasis added)

All three assumptions have serious flaws/limitations that may render any conclusions of impacts unreliable or meaningless.

Pg. 46:
"While the topography and effects on the individual pools are analyzed independently, the results are presented as an overall total for each key reach. The reason for this is the long time delay between the current field measurements and the predicted onset of groundwater drawdown from the mine. Impacts along Cienega Creek are not estimated to occur for at least 70 to 75 years after the start of mining.
It is not reasonable to expect that the specific individual pools measured would still exist in their current configuration at that time. ***However, the overall geomorphology of each key reach is assumed to remain similar, since substrate, slope, and bedrock controls would remain similar. In other words, even if the pools change or migrate, the overall number of pools per reach should remain similar****."* (emphasis added)

This assumption/logic is flawed and may result in underestimating impacts to individual pools within a reach. Changes in surface and groundwater hydrology are known to have effects on sediment transport and bank stability which may result in changes in channel substrate, siltation rates, and morphology. Such changes will likely affect reach specific pool numbers and dimensions. The assumption that the overall number of pools per reach will remain similar over time is likely not true. Rather, it is more likely that the number of pools in each will change over time as surface and groundwater conditions change.

Pg. 46:
"Climate change has been incorporated into the analysis by analyzing trends over the past decade and incorporating additional groundwater drawdown due to expected future changes in temperature. ***Expected changes in precipitation have not been incorporated, since the trend analysis indicates that the hydrographs analyzed already reflect precipitation conditions similar to those expected to be experienced in the future."*** (emphasis added)

This logic seems flawed. Why wouldn't the effects of climate change be additive. The above assumes that the current drought is the result of climate change and not natural drought cycle variation. The FEIS should at least present two scenarios: one with current precipitation trends and another with an additive effect of climate change.

Pg. 47:
"In the FEIS, Gardner Canyon was analyzed as a stream reach. Based on information collected between May and November 2014, it does not appear that Gardner Canyon has perennial flow that supports a core aquatic system similar to those seen on Cienega Creek and Empire Gulch. ***No key reaches were identified on Gardner Canyon during the collaboration."*** (emphasis added)

It is not clear why we would drop Gardner canyon as a key reach because there is no perennial flow. Are we not concerned about effects to riparian systems?

Pg. 47 states:
"In the FEIS, wetland areas adjacent to Cienega Creek were analyzed as part of the overall riparian corridor. The collaboration identified one wetland area of particular importance not only from a biological standpoint, but because of its closer proximity to Empire Gulch and higher levels of predicted mine drawdown, as well as the importance for species reintroductions. ***Cieneguita Wetlands, which are located within the Empire Gulch floodplain upstream from the confluence with Cienega Creek, have been identified as a key reach."*** (emphasis added)

While we support inclusion of Cieneguita Wetlands in the impact analysis, we question why other wetlands were not included in the analysis.

Pg. 58:
"*The first statistic is commonly known as the P value. The P value can be described as the probability that the linear regression line would occur as calculated, if in reality there is no relationship between the explanatory and the response variables (i.e., the "null hypothesis" is true). In other words, the lower the P-value, the less likely the linear regression line is to have occurred purely by accident.*
Commonly, the P-value is used to determine significance as follows:

- $P \leq 0.01$. *Very strong presumption against null hypothesis.*
- $< P \leq 0.05$. *Strong presumption against null hypothesis.*
- $0.05 < P \leq 0.1$. *Low presumption against null hypothesis.*
- $P > 0.01$. *No presumption against the null hypothesis.*

For the purposes of this analysis, any P value less than or equal to 0.05 is considered statistically significant*."* (emphasis added)

The significance of the P-value is not determined by the test, but by the individual conducting the test. Using various arbitrary ranges of P -values to determine statistical significance is not particularly useful in determining biological significance for purposes of these analyses that are characterized by small sample sizes and conditions where small changes in measured outcomes may result in large, significant biological effects.

Experiment-wise error rates are not meaningful, because they are based on the idea of fixing alpa and have meaning only for the hypothetical situation where every null hypothesis being tested is true. The import of a low P value is not so much that it allows you to conclude the null hypothesis is false, but rather it is that a low P value indicates you have a good idea of the sign (-,+) and magnitude of the effect. A high P value means you can't even be sure about the sign of the true effect, let alone of its magnitude. The statistical analysis uses fixed experiment-wise error rates to determine significance, but there are simply no good reasons to do so. We should be evaluating the gradations and strength of the evidence. There is no sharp dividing line between probable and improbable results.

Pg. 59 – USGS Review of Linear Regression Analysis:

EPA concurs with USGS regarding their caution on the reliance of a single piezometer for the linear regression analysis. Although this is additional information for consideration, we do not believe it is sufficient upon which to draw conclusions. This is especially so given that other variables such as geology, climate and drought are not included in this analysis. EPA is concerned with the use of extrapolation. Whenever a linear regression model is fit to a group of data, the range of the data should be carefully observed. Attempting to use a regression equation to predict values outside of this range is often unreliable, resulting in forecasting error.

Pg. 63 – Climate Change Stress Analysis:

"With respect to precipitation amount, review of the current trends (see appendix B) indicates that during the current ongoing drought, between 2001 and 2014, precipitation has already been in the overall range predicted by climate change (see appendix B, figures B3, B4, and B5). As indicated in the FEIS, one driving factor behind adopting the hydrograph analysis technique used in the FEIS and this SIR is that it incorporates a period of severe drought into future predictions: "The patterns seen in Southern Arizona in the past few decades, and particularly on Cienega Creek, provide a template for what long-term climate change could look like. Prolonged droughts brought on by climate change could result in similar shifts from perennial to intermittent flow along upper Cienega Creek and Empire Gulch" (FEIS, p. 566)."

Please explain why climate change effects are not additive to current temperature and precipitation conditions. The assumption in the SIR is that current conditions are due to climate change and this has not been proven true. The fact that mean annual temperatures do not reflect climate change models suggests that the current drought may be, in part, the result of natural precipitation.

EPA finds that this analysis is highly speculative and therefore predictions based this analysis should be treated with caution.

Pg. 65 - Sources of Uncertainty and the 95th Percentile Analysis

The SIR analysis attempts to condense the modeling scenarios and parameters into a single useful prediction that incorporates all sources of uncertainty. Two factors were incorporated to create a single range that would be expected to represent 95 percent of the possible outcomes. For each key reach, each time step, there are predictions of drawdown from 37 to 38 modeling scenarios. The drawdown from these outcomes was ranked and the 95^{th} percentile range was calculated. In addition, the 95 percent confidence interval was calculated using a linear regression analysis. The SIR states these two factors were then combined to create a single low and single high scenario with 95% of all outcomes falling with the range of these two scenarios.

In addition to the uncertainty of the models, combining different models with different assumptions and condensing them into a single prediction based on the 95^{th} percentile range is not meaningful. It does not provide greater certainty in predicting the impacts of groundwater drawdown from the mine on surface waters. Furthermore, combining this single outcome with the results of the 95% confidence interval of the linear

regression analysis to obtain a single low and single high scenario to explain a range of effects from groundwater drawdown is not meaningful or appropriate.

Pg. 65:
"*The Coronado determined that incorporating additional stresses due to basin growth would be speculative and is not warranted."*

This is a serious analytical shortcoming of the analysis as stresses related to future growth in basin water use may result in additive/cumulative effects that significantly increase the likelihood of adverse effects to aquatic/riparian communities when considered with the effects of mine groundwater drawdown. A range of possible effects from basin stressors should be incorporated into the modeling.

Pg. 66 and Table 12:
"*As previously discussed, there is also statistical uncertainty also in the translation of groundwater drawdown into reductions in stream flow, which was developed using linear regression of available field data. In this case, the 95 percent confidence interval[5] can be calculated within which we know that 95 percent of the possible regression slopes would fall."*

A number of problematic assumptions regarding the application of the data and of certain statistical analyses of these data bring into question the validity and usefulness of the presented range of results. Therefore, all results should be viewed with caution as they may not reflect actual potential outcomes.

Pg. 83 Seasonal Correction:
"It is recognized that this pool survey was not conducted during the same time of year that is of interest for the presence of refugia pools. Although the pool survey was conducted in November and December during a period that generally is not influenced by runoff, similar to the critical low-flow period in May and June, groundwater levels potentially sustaining the pools during May and June would likely be lower."

This reflects a serious sampling problem. Pool surveys should be conducted during the May-June driest period to verify that the November-December samples are representative when adjusted to the seasonal correction factor.

Pg. 184 - Climate Change.
"*Upper Empire Gulch: The magnitude of potential mine-related impacts is expected to be greatest in Upper Empire Gulch. While climate change would have an impact on stream flow and pool volume, the effects of climate change on the water resources in this area would not substantially add to the effects of the Barrel Alternative due to the magnitude of the potential mine-related impacts. Therefore, no substantial additional impacts to biological resources or species known to occur in DRAFT Rosemont Copper Project Supplemental Information Report – March 2, 2015 185 Empire Gulch Reach 1 (i.e., Chiricahua leopard frog, northern gray hawk, northern beardless tyrannulet, western yellow-billed cuckoo, southwestern willow flycatcher, and Abert's towhee) are expected in this location as a result of climate change.*

Cienega Creek: The mine drawdown alone is expected to have no or little effect on drying of the stream. However, the climate change scenario by itself would have a substantial effect on stream flow and pools, particularly in the downstream reaches of Cienega Creek, where days of zero flow would increase, and though the number pools are not expected to decrease, their volume would. Further, the lower reaches would see greater reductions than higher reaches. Thus, climate change by itself is likely to reduce the habitat extent and quality for aquatic species at Cienega Creek. Impacts to aquatic species occurring here (Huachuca water umbel, Chiricahua leopard frog, lowland leopard frog, northern Mexican gartersnake, longfin dace, Gila chub, and Gila topminnow) are expected to include the loss of habitat, reduction of habitat quality, and increased predation, particularly in lower reaches of Cienega Creek."

If climate change alone is expected to have significant impacts to Cienega Creek aquatic habitats and species, then how can one conclude that climate change would not add substantially to the impacts from the Barrel Alternative

at Upper Empire Gulch. This is not logical…the effects of climate change would be additive and therefore significant.

Appendix E. - Linear Regression Analysis for Groundwater Depth Versus Streamflow

Several tables are provided presenting a Summary of the Regression Analysis outputs. With limited information, EPA is unclear on some of the statistical analysis performed. It appears that multiple samples from each experimental unit are taken rather sequentially over several dates. Dates are then taken to represent replicated treatments and significance tests are applied. Treating successive dates as if they are independent replicates of a treatment is invalid. EPA recommends a re-evaluation of the statistical analysis conducted on the groundwater/streamflow data.

FENNEMORE CRAIG, P.C.

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Phoenix	(602) 916-5000
Reno	(775) 786-5000
Tucson	(520) 879-6800

March 24, 2015

Via Email to: R3_FOIA@fs.fed.us
and Certified Mail, Return Receipt Requested

FOIA Officer
Forest Service Region 3
333 Broadway SE
Albuquerque, New Mexico 87102

Re: Rosemont Copper Project; Freedom of Information Act Request

Dear Sir/Madam:

We represent Rosemont Copper Company ("Rosemont") in connection with its development of the Rosemont Copper Project. On behalf of Rosemont, we request the Coronado National Forest provide the following information pursuant to the Freedom of Information Act, 5 U.S.C. §552 *et seq.*:

> Copies of all correspondence, electronic or otherwise, and all other documents from any federal agency commenting on or otherwise relating to the **Rosemont Copper Project Supplemental Information Report, dated March 16, 2015.**[1]

Please supply the records without informing me of the cost if the fees do not exceed $500, which I agree to pay. Alternatively, in order to simplify the process and reduce costs, we request that you provide us with electronic copies of the requested documents on a CD, DVD or USB drive.

If you deny any part of this request, please cite each specific reason that you think justifies your refusal to release the information.

---

[1] A copy of the report's cover and table of contents is attached for ease of reference.

Please feel free to contact me if you have any questions or require any additional information.

Sincerely,

Norman D. James

cc: Jim Upchurch, Forest Supervisor
Coronado National Forest

Enclosure

10185534.1

USDA

United States Department of Agriculture

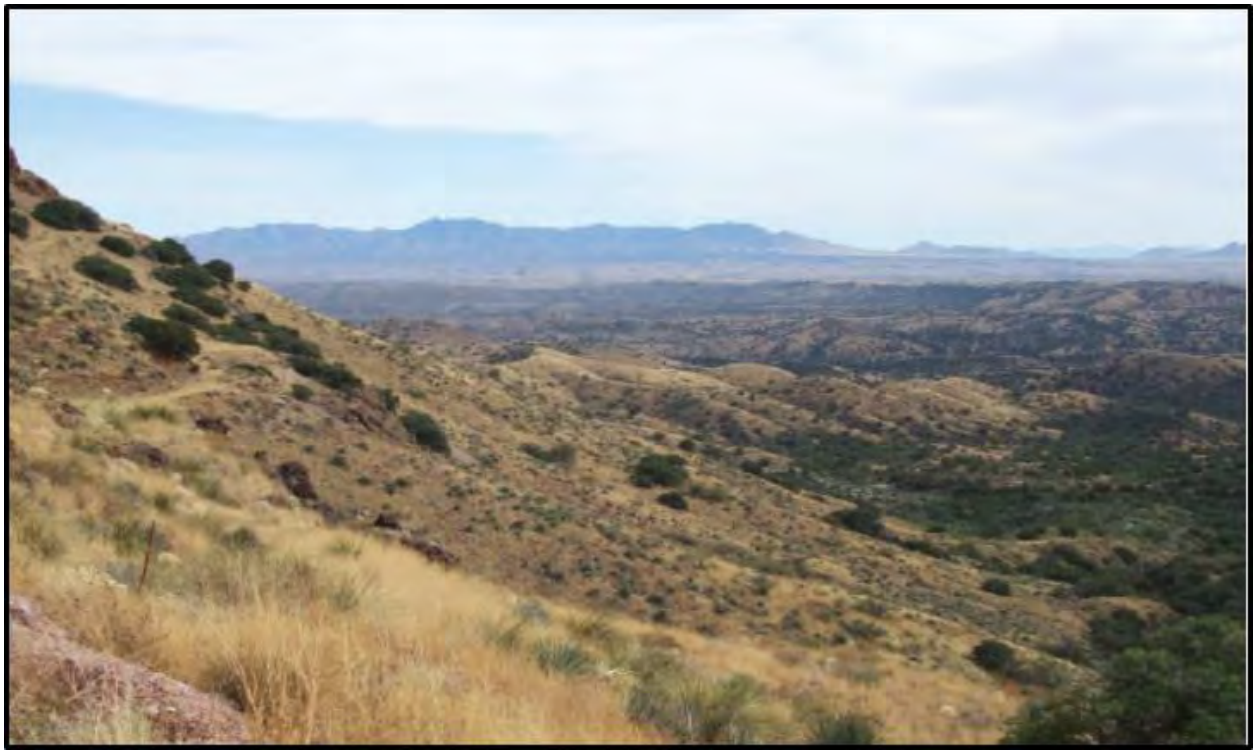
Forest
Service

**Southwestern
Region**

March 2015

Supplemental Information Report

Rosemont Copper Project



Contents

Appendices

Figures

Tables

Introduction and Background

In December 2013, a final environmental impact statement (FEIS[1]) and draft record of decision (draft ROD) were published by the Coronado National Forest (Coronado) for the Rosemont Copper Project. The draft ROD described the Selected Action (Alternative 4 – Barrel Alternative, as described in the FEIS) and the rationale for its selection.

The Administrative Review Objection Period was held from January 1 through February 14, 2014. After determining that 101 objectors were eligible, the Regional Office proceeded to review and respond to these objections. This review was extended due to the content and complexity of the objections, but also because of information coming from the U.S. Fish and Wildlife Service (USFWS) regarding the sighting of a protected species (ocelot) within the analysis area. Additionally, as explained in the Regional Forester's objection response letter, a number of Objectors introduced what they presented to be "new information" not previously considered (U.S. Forest Service 2014).

In May 2014, the Coronado decided to reinitiate formal consultation under the Endangered Species Act (ESA), based on the sightings of ocelot within the project area. As part of these discussions, the Coronado made an effort to enhance the existing analysis completed for the USFWS in the previous biological assessment (BA) and in several supplemental BAs (SBAs). Both the Coronado and USFWS were striving to improve the accuracy or reduce the uncertainty of the analysis associated with the biological opinion (BO) that was prepared for the FEIS, and specifically uncertainty related to impacts within the Las Cienegas National Conservation Area (NCA), in riparian areas along Empire Gulch and Cienega Creek. A number of agencies were invited to participate in meetings and a renewed effort to exchange information, in order to better document baseline conditions and refine the hydrologic analyses related to riparian areas. This exchange brought forward numerous documents, field data, and analyses not previously provided to the Coronado, which constituted new information under National Environmental Policy Act (NEPA) regulations.

This report is informed by a number of sources of new information. One was the review of potential new information presented in objections to the FEIS and draft ROD. The Coronado conducted a review of all eligible objections for attached documents and referenced sources of information that could potentially provide new information that had not previously been considered by the interdisciplinary (ID) team. All such information was screened to determine whether the new information could reasonably result in changes to the analysis or conclusion of impacts disclosed in the FEIS. Any new information that passed this screening review was brought into this report for further evaluation. Additional sources of new information addressed in this report include materials supplied by Federal, State, and county agencies; results of additional field data collection; revised analysis using pertinent new information; and updated status of past, present, and reasonably foreseeable actions.

The new information is listed in appendix A and summarized in the "New Information" section of this report. In light of the new information, the Coronado conducted a review to determine the adequacy of the EIS. In accordance with Forest Service Handbook (FSH) 1909.15, chapter 10, section 18.1, "If new information or changed circumstances relating to the environmental impacts of a proposed action come to the attention of the responsible official after a decision has been made and prior to completion of the approved program or project, the responsible official must review the information

[1] Available at: http://www rosemonteis.us/final-eis. Further mention of the FEIS in this report will not be accompanied by a formal citation.

-----Original Message-----
From: Tony Davis [redacted]
Sent: Wednesday, March 25, 2015 8:34 AM
To: Kaplan, Marc -FS
Subject: From Tony Davis, requesting SIR comments

Marc,

Please send me copies of all written comments your agency has received on the recent Rosemont EIR. These should include but not be limited to comments from EPA, BLM and the US Army Corps of Engineers.

If you can send them to me without going through the FOIA process, please do so. If not, I request them under the federal Freedom of Information Act.

I believe these comments should be releasable because the CNF has released all other agency comments throughout the EIS process, thereby setting a precedent for release of these records. Since the SIR is on the Rosemont EIS website, these comments should indeed be considered part of that process.

My preference would be for the comments to be emailed to me. If that's not possible, could you please load them on a CD and mail them to me at:

Tony Davis
Arizona Daily Star
4850 S. Park Ave.
Tucson, AZ 85714

Thank you and sincerely,

Tony Davis
(b) (6) [redacted] c
806-7746 o

Sent from my iPhone

From: Upchurch, Jim -FS
To: Goforth, Kathleen
Subject: RE: Follow-up to Rosemont Informational Meeting
Date: Monday, March 09, 2015 10:53:00 AM
Attachments: removed.txt
image002.png
image003.png

Kathleen, I completely understand and appreciate your work on this.. please have your feedback by the 20th and we will incorporate…take care..Jim

USDA USFS

Jim Upchurch
Forest Supervisor

Forest Service
Coronado National Forest

p: 520-388-8306
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jupchurch01@fs.fed.us

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Tucson, AZ 85701
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Caring for the land and serving people

From: Goforth, Kathleen [mailto:Goforth.Kathleen@epa.gov]
Sent: Friday, March 06, 2015 4:54 PM
To: Upchurch, Jim -FS
Cc: DeRose, Margie B -FS; Jessop, Carter; Brush, Jason; Leidy, Robert
Subject: Follow-up to Rosemont Informational Meeting

Jim –
Thank you for Monday's presentation on the Supplemental Information Report. My staff and I found it to be a worthwhile investment of time and an excellent primer on what we would find in the SIR. Unfortunately, as I anticipated and stated at the beginning of that call, five days was simply not sufficient time for us to complete the requested review. At the conclusion of Monday's call, we understood that we would have, instead, until March 20th to provide you with our feedback; so we were surprised by the message we received from Margie DeRose on Tuesday, requesting "red flag issues" by today. Despite our best efforts to accommodate that request, staff with the technical expertise necessary to identify such issues have been unavailable all week due to workload constraints; therefore, we are unable to provide you with "red flags" at this time. We will continue to review the SIR and appendices and will provide you with any "red flags" or other feedback on or before the March 20th secondary deadline that Margie identified. I apologize for any inconvenience this might create. Thank you, again, for sharing the SIR with us.
-Kathy

Kathleen Martyn Goforth, Manager
Environmental Review Section (ENF-4-2)

U.S. Environmental Protection Agency, Region 9
75 Hawthorne Street
San Francisco, CA 94105
415-972-3521

********** ATTACHMENT REMOVED **********

This message contained an attachment which the administrator has caused to be removed.

********** ATTACHMENT REMOVED **********

Attachment name: [image001.jpg]
Attachment type: [image/jpeg]

From:	DeRose, Margie B -FS
To:	Jessop, Carter
Cc:	Goforth, Kathleen; Upchurch, Jim -FS; Goldmann, Elizabeth; Leidy, Robert; Brush, Jason
Subject:	RE: Follow-up to Rosemont Informational Meeting
Date:	Wednesday, March 18, 2015 4:27:19 PM
Attachments:	image001.png image002.png image003.png image004.png

Thank you for your input. We really appreciate you taking the time to provide us feedback on the SIR.

Margie B. DeRose, PG
Geologist / Project Manager

Forest Service
Coronado National Forest

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c: 5(b) (6)
mbderose@fs.fed.us

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Tucson, AZ 85701
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Caring for the land and serving people

From: Jessop, Carter [mailto:JESSOP.CARTER@EPA.GOV]
Sent: Wednesday, March 18, 2015 4:14 PM
To: DeRose, Margie B -FS
Cc: Goforth, Kathleen; Upchurch, Jim -FS; Goldmann, Elizabeth; Leidy, Robert; Brush, Jason
Subject: RE: Follow-up to Rosemont Informational Meeting

Margie,
Attached are EPA's comments on the Rosemont Copper Project Supplemental Information Report. As noted at the beginning of our letter, these comments represent a best effort to provide feedback on a few key issues, but should not be assumed to include all potential concerns regarding this material that might be identified by a more thorough examination.

Thank you for allowing us this opportunity to provide our informal feedback on this document.

Regards,
Carter

Carter W. Jessop
U.S. EPA, Region 9
Environmental Review Section (ENF-4-2)
75 Hawthorne Street
San Francisco, CA 94105
(415) 972-3815

jessop.carter@epa.gov

From: DeRose, Margie B -FS [mailto:mbderose@fs.fed.us]
Sent: Tuesday, March 03, 2015 8:31 AM
To: 'Marjorie.E.Blaine@usace.army.mil'; jason_douglas@fws.gov; 'jessop.carter@epa.gov'; 'goforth.kathleen@epa.gov'; jean_calhoun@fws.gov; tshannon@blm.gov; Leidy, Robert; ksimms@blm.gov
Cc: Melissa Polm; Upchurch, Jim -FS; Kingsbury, Jamie -FS; Ruyle, Jennifer -FS; Terry Chute; Chris Garrett (cgarrett@swca.com)
Subject: Follow-up to Rosemont Informational Meeting

Thank you all for participating in the meeting yesterday. Hopefully Chris and Angela's presentations helped to summarize the main points in the SIR.

As discussed during the meeting, we are looking for any red-flag issues you may see in the SIR by COB this **Friday, March 6th** and any other feedback you may have by **Friday, March 20th**. Please contact me with any questions and also send your input to me.

Thank you,
Margie

Margie B. DeRose, PG
Geologist / Project Manager

Forest Service
Coronado National Forest

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mbderose@fs.fed.us

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From: Chris Garrett [mailto:cgarrett@swca.com]
Sent: Sunday, March 01, 2015 7:49 PM
To: DeRose, Margie B -FS; 'Marjorie.E.Blaine@usace.army.mil'; jason_douglas@fws.gov; 'jessop.carter@epa.gov'; 'goforth.kathleen@epa.gov'; jean_calhoun@fws.gov; 'daniel_j_moore@blm.gov'; tshannon@blm.gov
Cc: Melissa Polm; Upchurch, Jim -FS; Kingsbury, Jamie -FS; Ruyle, Jennifer -FS; Terry Chute
Subject: Mon 3/2/15, Rosemont Informational Meeting

Good evening all –

The PDF of the presentation for our meeting Monday at 8:30 am will need to be downloaded due to

its file size. We didn't want to risk it getting kicked out based on system limitations. In order to retrieve the documents, please follow the instructions below. Login is case-sensitive, so please enter exactly as typed below. You will see three pdfs in this file-

1. The presentation from the meeting
2. The Supplemental Information Report (SIR) which is the text of the analysis and is just over 230 pages and
3. The SIR- Appendices

Go to https://client.swca.com/
Login name: R(b) (6)
Password: [redacted]

Given that our client access server requires Java Script, and I know some of the agency computers have had problems with that, I'll attempt to send the presentation as well tonight to the EPA participants, just in case. I'll also monitor my email leading up to the meeting tomorrow, if there are any last minute problems.

- Chris

Chris Garrett, P.HGW.
Professional Hydrologist - Ground Water
Tucson Office Director (Acting)
Cell: (b) (6)
Office: (520) 325-9194


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USDA

From: Willard, Lisa K -FS
To: Goforth, Kathleen
Subject: RE: Meeting with Coronado
Date: Wednesday, April 29, 2015 9:39:08 AM

Hi Kathy,

I am just returning today myself!

Jamie said you had requested the meeting regarding Rosemont….. Other than that, I do not have any further information.

Lisa

From: Goforth, Kathleen [mailto:Goforth.Kathleen@epa.gov]
Sent: Sunday, April 26, 2015 9:24 PM
To: Willard, Lisa K -FS
Subject: Re: Meeting with Coronado

Hi, I am just returning from vacation and trying to catch up on email. Can you tell me the purpose of this meeting?
Thanks -
- Kathy

Sent from my iPhone

On Apr 22, 2015, at 11:52 AM, Willard, Lisa K -FS <lisakwillard@fs.fed.us> wrote:

> Good Morning,
>
> Jamie Kingsbury, Acting Forest Supervisor, asked that I contact you to schedule a meeting between the both of you, Jim Upchurch, Jennifer Ruyle, Chris Garrett, and Andrew Johnson (our Acting Deputy Forest Supervisor).
>
> Can you please give me a few dates/times that would work for you? There are a lot of people involved, so I will take your dates and take it from there!
>
> Thank you so much!
>
> Lisa

<image001.png>

Lisa K. Willard
Executive Assistant

Forest Service
Coronado National Forest, Supervisor's Office

p: 520-388-8320
lisakwillard@fs.fed.us

300 W. Congress Street
Tucson, AZ 85701
www.fs.fed.us


Caring for the land and serving people

From: Upchurch, Jim -FS
To: Goforth, Kathleen
Subject: RE: Question re: Rosemont SIR
Date: Thursday, March 12, 2015 12:46:48 PM
Attachments: removed.txt
image002.png
image003.png

We are not planning on publishing per se but we will post it on our Rosemont website…..Jim

USDA USFS

Jim Upchurch
Forest Supervisor

Forest Service
Coronado National Forest

p: 520-388-8306
c: 5(b) (6)
f: 520-388-8305
jupchurch01@fs.fed.us

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Tucson, AZ 85701
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Caring for the land and serving people

From: Goforth, Kathleen [mailto:Goforth.Kathleen@epa.gov]
Sent: Wednesday, March 11, 2015 5:16 PM
To: Upchurch, Jim -FS
Subject: Question re: Rosemont SIR

Hi, Jim –
Thanks for your understanding and flexibility on the deadline for us to send you our feedback on the SIR.
I want to check in with you about something in the article below. It was our understanding that Forest Service was intending the SIR to be an internal document, but the statement in the article that it will be "published" suggests that it may be released for public review. Did we misunderstand or has there been a change of plans in that regard (or is the article in error)?
-Kathy

Kathleen Martyn Goforth, Manager
Environmental Review Section (ENF-4-2)
U.S. Environmental Protection Agency, Region 9
75 Hawthorne Street
San Francisco, CA 94105
415-972-3521

From: Jessop, Carter
Sent: Wednesday, February 11, 2015 3:25 PM
To: Goforth, Kathleen

Cc: Goldmann, Elizabeth; Leidy, Robert
Subject: "Top Rosemont decision maker Upchurch leaving his job for a higher post"

http://tucson.com/news/blogs/desertblog/top-rosemont-decision-maker-upchurch-leaving-his-job-for-a/article_07df24be-b239-11e4-8500-6f6f0bd27115.html

Top Rosemont decision maker Upchurch leaving his job for a higher post

Coronado National Forest Supervisor Jim Upchurch, whose name has become almost synonymous with the protracted Rosemont Mine controversy, is leaving his job in two months for a higher-level post in Albuquerque.

Upchurch will become a deputy to Regional Forester Calvin Joyner in the Forest Service regional forester's office there.

Since coming to his current job in October 2010, Upchurch has shepherded the stormy process over the mine proposed for the Santa Rita Mountains through dozens of detailed documents and numerous public hearings. It was under his watch that the controversial draft and final environmental impact statements for the mine were written.

The mine would produce 243 million pounds of copper annually and employ at least 400 people over its 20-plus-year life. But opponents have warned that it could pollute water, seriously harm endangered species and dry up the neighboring Cienega Creek and Davidson Canyon -- allegations all denied by Rosemont Copper.

Upchurch made a draft decision in favor of the mine in December 2013. But he had to put a final decision on hold last May.

That came after an endangered ocelot was discovered at the mine site and after the Fish and Wildlife Service raised a red flag about potential impacts to five other currently protected and two other species then proposed for federal protection that live in and around neighboring streams.

The two species that were at the time proposed for federal protection -- the Western yellow-billed cuckoo and the Northern Mexican garter snake -- have since been listed by the wildlife service as threatened.

The Forest Service and other agencies have been working ever since on trying to better understand the potential impacts so the service could publish an updated biological assessment on the mine. That assessment -- which will be signed by a biologist, not Upchurch -- almost certainly won't be published before Upchurch leaves, he said Wednesday.

For now, the Forest Service is working on an informational report -- to be used to prepare the formal assessment -- that it expects to publish in two months. Upchurch said at this point he doesn't know when the biological assessment will be published.

Once that's done, the wildlife service will conduct its own review of the project. That will lead to a final biological opinion that will determine if the mine will have legally unacceptable impacts on endangered and threatened species or if the impacts can be successfully mitigated.

Then, the Forest Service will make a final decision on the mine.

In any case, Upchurch said he will continue to be heavily involved in the mine issue in his new job. He isn't taking the Albuquerque position to get away from the mine controversy that has dogged him since his arrival, he said.

His draft decision in favor of the mine drew 102 formal, written objections from opponents and critics. But the Forest Service later determined that none of the objections raised legal issues strong enough to force reconsideration of the project or a rewrite of the Rosemont environmental impact statement.

"As much of a workload as it is, it is still a passion of mine that we get it right," Upchurch said of the Rosemont issue Wednesday in a telephone interview. "There's no getting away from a project of this size."

Upchurch said he doesn't know when his replacement will be named, and replacing him "might take awhile." An acting supervisor will take his position for a time, but no one has been named to that job yet, he said.

Carter W. Jessop
U.S. EPA, Region 9
Environmental Review Section (ENF-4-2)
75 Hawthorne Street
San Francisco, CA 94105
(415) 972-3815
jessop.carter@epa.gov

********** ATTACHMENT REMOVED **********

This message contained an attachment which the administrator has caused to be removed.

********** ATTACHMENT REMOVED **********

Attachment name: [image001.jpg]
Attachment type: [image/jpeg]

From: Vogel, Mindy S -FS
To: Jessop, Carter
Subject: RE: Rosemont Water Quality data
Date: Friday, July 17, 2015 10:27:40 AM
Attachments: image001.png
image002.png
image003.png
image004.png

Hi Carter.

Please look at SIR Reference "Hudbay 2015e". It's on the website and here's the direct link:
http://rosemonteis.us/files/references/048930.pdf

If you have any other questions, please let me know.

Mindy Sue Vogel
Minerals & Geology Program Manager

Forest Service
Coronado National Forest

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From: Jessop, Carter [mailto:JESSOP.CARTER@EPA.GOV]
Sent: Thursday, July 16, 2015 6:12 PM
To: Vogel, Mindy S -FS
Subject: Rosemont Water Quality data

Hello Mindy,
Please see below. Elizabeth Goldmann has been looking into the potential water quality impacts identified in the FEIS/SIR. The excerpt below is from page 135 of the SIR. Do you happen to know the source of this data? If it is a new technical report, could you possibly send us an electronic version?

Thank you for your assistance.

-Carter Jessop

Carter W. Jessop

U.S. EPA, Region 9
Environmental Review Section (ENF-4-2)
75 Hawthorne Street
San Francisco, CA 94105
(415) 972-3815
jessop.carter@epa.gov

From: Goldmann, Elizabeth
Sent: Thursday, July 16, 2015 2:45 PM
To: Jessop, Carter
Subject: RM

Hi Carter,

I cannot find any source for the "new information" regarding water quality in Davidson Canyon. It would be helpful to obtain it from USFS. Thanks, E.

Based on the new information received, there is now some record of runoff water quality in Davidson Canyon. Almost without exception, average concentrations in Davidson Canyon are less than those in Barrel Canyon. This is true for aluminum (total), antimony (total), arsenic (total), barium (total), beryllium (total), cadmium (total and dissolved), calcium (total), chloride (total), chromium (total and dissolved), copper (total and dissolved), fluoride (total), iron (total), lead (total and dissolved), magnesium (total), manganese (total), molybdenum (total), nickel (total and dissolved), nitrate, selenium (total), silver (total and dissolved), sodium (total), sulfate (total), thallium (total), and zinc (total and dissolved). Two constituents have higher average concentrations in Davidson Canyon than Barrel Canyon: total dissolved solids, and potassium (total). Several constituents are unable to be compared due to laboratory detection limits, including arsenic (dissolved), iron (dissolved), and mercury (total and dissolved). SIR p. 135.


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USDA

From:	Leenhouts, James
To:	Vogel, Mindy S -FS
Cc:	Kingsbury, Jamie -FS; Johnson, Andrew -FS; Calhoun, Jean (jean_calhoun@fws.gov); tshannon@blm.gov; Marjorie Blaine (Marjorie.E.Blaine@usace.army.mil); Johnson, Kathleen
Subject:	Re: close-out of USGS Task 4
Date:	Wednesday, June 10, 2015 9:18:26 AM
Attachments:	image001.png image003.png image004.png image002.png

---

Hi Mindy,

Thank you for the responses to our comments; we were happy to provide our perspective.

Jim

On Fri, Jun 5, 2015 at 11:02 AM, Vogel, Mindy S -FS <msvogel@fs.fed.us> wrote:

> Hi Jim.
>
> Please refer to the attached letter from the Coronado to you and your staff. We greatly appreciate your help throughout the last year in working on the Rosemont project. I will be sending you a hard copy of this letter today also.
>
> If you have any question, please feel free to contact me.
>
> Thanks!!

Mindy Sue Vogel
Minerals & Geology Program Manager
Forest Service

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--

James Leenhouts, Ph.D.
Director, USGS Arizona Water Science Center
520 N. Park Ave.
Tucson, AZ 85719
Office: 520-670-6671 ext. 278
Cell: 5(b) (6) 8
leenhout@usgs.gov


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USDA

From:	Vogel, Mindy S -FS
To:	Marjorie.E.Blaine@usace.army.mil; jason_douglas@fws.gov; Jessop, Carter; Goforth, Kathleen; jean_calhoun@fws.gov; tshannon@blm.gov; Leidy, Robert; ksimms@blm.gov
Cc:	brocious@base.sao.arizona.edu; cbeck@azdot.gov; mhont@azdot.gov; nm1@azdeq.gov; David.Jacobs@azag.gov; falco@cfa.harvard.edu; dbrocious@cfa.harvard.edu; rdelrosario@asmi.az.gov; Julia.Fonseca@pima.gov; Nicole.Fyffe@pima.gov; frank.postillion@rfcd.pima.gov; JWindes@azgfd.gov; twade@azgfd.gov; kterpening@azgfd.gov; karen.howe@tonation-nsn.gov; laura.berglan@tonation-nsn.gov; peter.steere@tonation-nsn.gov; david.stine.1@ang.af.mil; safabritz@azwater.gov; lee.allison@azgs.az.gov; Leslie.Ethen@tucsonaz.gov; nicole.ewing-gavin@tucsonaz.gov; LSwartzbaugh@asmi.az.gov; rcasavant@azstateparks.gov; rsejkora@azstateparks.gov; ohenderson@ci.sahuarita.az.us; scott_stonum@nps.gov; darla_sidles@nps.gov; leenhout@usgs.gov; saleake@usgs.gov; jphoffma@usgs.gov; kudall@ci.sahuarita.az.us; ohenderson@sahuaritaaz.gov; Victoria Boyne; laurie.suter@tonation.nsn.gov
Subject:	Rosemont SIR
Date:	Friday, May 22, 2015 4:21:18 PM
Attachments:	image001.png image002.png image003.png image004.png SIR_cover_ltr_sign_052215.pdf

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Hello Rosemont Cooperators!

I am writing to provide you with an update on the Rosemont Copper Project.

The Supplemental Information Report (SIR) has been completed and is getting posted it to the project website (http://www.rosemonteis.us/sir) today along with the cover letter (attached) and a Q&A information sheet.

Additionally, the Supplemental Biological Assessment is nearly complete and going through final editing. We anticipate submitting that to the USFWS shortly.

If you have any questions, please feel free to contact me (info below).
Thanks.

Mindy Sue Vogel
Minerals & Geology Program Manager

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Forest Service

Coronado National Forest
Supervisor's Office

300 West Congress St.
Tucson, AZ 85701
520-388-8300
FAX: 520-388-8305

File Code: 2810; 1950 **Date:** May 22, 2015
Route To:

Subject: Rosemont SIR cover letter

To: Project Record, Rosemont Copper Project

Since the Final Environmental Impact Statement (FEIS) and draft Record of Decision (ROD) for the Rosemont Copper Project (Rosemont) were published in December 2013, new information pertaining to resource conditions, analysis methodologies, and cumulative effects analysis has come to my attention.

The Objection Period for the FEIS and draft ROD occurred from January 1 through February 14, 2014. After reviewing the objections, the Regional Forester issued an objection response letter dated June 13, 2014. This letter noted that a number of Objectors introduced what they presented to be "new information" that was not previously considered. The Regional Forester thereby instructed the Forest Supervisor to review that information prior to issuing a final ROD to determine if this "new information" would require additional National Environmental Policy Act (NEPA) analysis.

Additionally, the Coronado National Forest (CNF) decided to reinitiate formal consultation under the Endangered Species Act in May 2014, based in part on the sightings of an ocelot within the project area. Since this decision, the CNF has made an effort to refine the existing analysis that was completed for the U.S. Fish and Wildlife Service (USFWS) in the project's previous biological assessment (BA) and several supplemental BAs. The CNF was striving to improve the accuracy and/or reduce the uncertainty of the original BA analysis associated with the biological opinion that was prepared for the FEIS. In particular, the agency was looking to improve the uncertainty related to impacts within the Las Cienegas National Conservation Area and within the riparian areas along Empire Gulch and Cienega Creek. In order to better document baseline conditions and refine the hydrologic analyses related to these riparian areas, the CNF invited numerous federal agencies to participate in meetings in a renewed effort to exchange information and enlist their resource expertise. This exchange brought forward numerous documents, field data, and analyses not previously provided to the CNF, some of which was new information that must be considered under NEPA.

The CNF's Interdisciplinary (ID) Team and our consultants reviewed all the new information in light of the conditions, analysis, and conclusion of impacts presented in the FEIS. This review considered the potential effects of the new information on all of the resource areas (i.e. biology, hydrology, air) previously addressed in the FEIS. The effects of the new information were compared to the effects disclosed in the FEIS and determinations were made as to whether incorporation of the new information would result in changes to baseline conditions, analysis methodology, or the conclusion of impacts. The results of this review are presented in the Rosemont Supplemental Information Report (SIR), May 2015.

While consideration of some new information resulted in changes to some baseline conditions and analysis methodologies, it did not result in major changes to any of the conclusions of impacts disclosed in the FEIS. Furthermore, review of the new information revealed no significant deficiencies in the FEIS analysis. However, there are some minor changes or clarifications needed, which will be addressed in one or more errata to the FEIS.

Based on the review documented in the SIR, I have determined that the new information and/or changed circumstances are within the scope and range of effects considered in the original analysis. Therefore, no significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts were found that would require a supplement or revision of the Rosemont FEIS.

For JAMIE KINGSBURY
Acting Forest Supervisor

From:	Vogel, Mindy S -FS
To:	leenhout@usgs.gov
Cc:	Kingsbury, Jamie -FS; Johnson, Andrew -FS; Calhoun, Jean (jean_calhoun@fws.gov); tshannon@blm.gov; Marjorie Blaine (Marjorie.E.Blaine@usace.army.mil); Johnson, Kathleen
Subject:	close-out of USGS Task 4
Date:	Friday, June 05, 2015 11:02:41 AM
Attachments:	image001.png image002.png image003.png image004.png USGS_ltr_final_060515.pdf

---

Hi Jim.

Please refer to the attached letter from the Coronado to you and your staff. We greatly appreciate your help throughout the last year in working on the Rosemont project. I will be sending you a hard copy of this letter today also.

If you have any question, please feel free to contact me.
Thanks!!

Mindy Sue Vogel
Minerals & Geology Program Manager

Forest Service
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USDA United States Department of Agriculture
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FAX: 520-388-8305

File Code: 1950; 2810
Date: June 5, 2015

Mr. James Leenhouts
Director, USGS Arizona Water Science Center
520 N. Park Ave.
Tucson, AZ 85719

Dear Mr. Leenhouts:

On March 17, 2015, the U.S. Geological Survey (USGS) provided the Coronado National Forest (CNF) with suggestions regarding potential further steps that could be taken with the groundwater models used for the Rosemont Copper Project. The purpose of this letter is two-fold: First, I would like to express my appreciation for your technical assistance on the Rosemont project; and second, to provide the USGS with a response to your letter and summarize the Forest Service's (FS) internal review of the suggestions provided by the USGS.

In May 2014, the CNF Forest Supervisor indicated the intention of the FS was to reinitiate consultation with the U.S. Fish and Wildlife Service (USFWS) under Section 7 of the Endangered Species Act. As part of the reinitiation process, the Forest Supervisor requested that discussions be undertaken with the Bureau of Land Management (BLM), USFWS, USGS, and other cooperators to ensure that all pertinent information had been obtained regarding baseline conditions. In particular, the CNF was seeking information on Las Cienegas National Conservation Area and other aquatic resources, with a specific emphasis on Empire Gulch and Cienega Creek.

As part of the discussions with other federal agencies during the Section 7 process, the USGS was asked to provide opinions on a variety of technical issues, including aspects of the groundwater models used by the FS for predicting impacts from the proposed Rosemont Copper Project. The most recent input from the USGS was summarized in the March 17, 2015, letter[1], which was prepared at the request of the CNF following a meeting on March 9, 2015, between the USFWS, USGS, and the CNF.

In the March 17, 2015, letter to the CNF, the USGS outlines three specific suggestions for additional tasks that could be conducted in order to better understand the uncertainty associated with the modeled impacts of groundwater drawdown on distant riparian areas such as Empire Gulch and Cienega Creek. The CNF Forest Supervisor requested that FS hydrology specialists within the Centralized National Operations (CNO) Minerals and Geology program review the USGS suggestions. The CNO findings were provided to the CNF in a memo dated March 31, 2015[2], which is included as Attachment A to this letter.

[1] March 17, 2015. "Opportunities to understand the inherent uncertainty of potential changes to riparian areas in response to the Rosemont Copper Project"
[2] March 31, 2015. "Evaluation of Additional Groundwater Modelling Tasks Suggested by USGS for the Rosemont Mine Project"

The following is a summary of the three proposed suggestions by the USGS and the FS findings as stated in the March 31st CNO response letter:

(1) *Increase the range of storage parameters used in the sensitivity analysis.* The USGS indicated in their suggestions that: "To improve the models' ability to explain system uncertainty, specific yield could be varied by an order of magnitude and specific storage by three orders of magnitude." The FS reviewed the body of information related to storage parameters and concluded that: "There does not appear to be any significant gains in our knowledge of the effects on riparian areas from further varying storage parameters in the Rosemont models."

(2) *Employ a Monte Carlo approach to improve prediction uncertainty.* The USGS indicated in their suggestions that "A Monte Carlo approach applied to the Rosemont project groundwater models, varying key variables of hydraulic conductivity and storage parameters (specific yield and specific storage) with constant head and no-flow boundary conditions, would improve the models' ability to characterize system uncertainty." The FS researched the applicability of using the Monte Carlo approach and concluded that: "The bottom line is that the method used in the Rosemont modeling Sensitivity Analysis, is a rigorous and acceptable technique for evaluating uncertainty. There does not appear to be anything gained by performing further uncertainty analyses, including the Monte Carlo method. A Monte Carlo analysis is not a trivial task and the results probably would not change the overall conclusions that have already been established."

(3) *Use a water-budget approach to evaluate effects to riparian areas.* The USGS indicated in their suggestions that: "To better understand the project effects on the discharge of water to springs and streams, a water-budget approach, in addition to the current drawdown analysis, could be employed. Some springs and streams that have been identified as important for ecosystems are not explicitly simulated in the models. The potential change in discharge can be examined by adding appropriate boundaries that represent these features in the models." The Forest Service considered this approach and ultimate concluded: "While the use of water budgets may have some value, it probably would not change the overall conclusions that have already been established or, significantly decrease the uncertainties inherent in this modeling effort."

In summary, the FS acknowledges and appreciates the input and concerns put forward by specialists from all of the federal agencies involved over the last year in re-examining the potential for the Rosemont Copper Project to affect aquatic resources. There are many ways groundwater models could be constructed, and the groundwater models used for the Rosemont Copper Project reflect one set of assumptions among many that could have been chosen. As described in the Supplemental Information Report, at this time the FS believes that the groundwater models have been fully examined and are being used with the appropriate caution, and further that the additional strategies adopted to balance the acknowledged uncertainties allow for a robust examination and disclosure of the potential impacts of the project.

If you have any questions, please contact the Rosemont Project Manager, Ms. Mindy Sue Vogel, at 520-388-8327 or msvogel@fs.fed.us.

Sincerely,

JAMIE KINGSBURY
Acting Forest Supervisor

Attachments:
A – FS CNO memo (March 31)

ec: Jean Calhoun, USFWS
Tim Shannon, BLM
Marjorie Blaine, USACE
Kathleen Johnson, EPA

Attachment A

March 31, 2015

MEMORANDUM

TO: Jim Upchurch, Supervisor, Coronado National Forest
FROM: Joe Gurrieri and Roger Congdon, USFS Groundwater Program, WO

SUBJECT: Evaluation of Additional Groundwater Modelling Tasks Suggested by USGS for the Rosemont Mine Project

The WO Groundwater Team was asked to assist the Coronado NF in evaluating the efficacy of performing additional groundwater modeling tasks for the Rosemont Mine project as suggested by the USGS, Arizona Water Science Center. The USFS requested that the USGS review the documentation as part of Task 4: USGS Review of Boundary Condition Test Documentation, completing the following items:

(1) Evaluate if the tests were conducted in the manner suggested by the USGS;

(2) Evaluate if the results of these tests help reduce the uncertainty associated with the groundwater models by better describing the effects that boundary conditions have on model results.

On March 9, 2015, the USGS presented their results from Task 4 during a meeting with the Coronado National Forest, U.S. Fish and Wildlife Service, and SWCA Consultants. The USGS identified three topical areas that would substantively improve the groundwater models' capacity to simulate inherent uncertainty in the groundwater system:

1. Increase range of storage parameter values in uncertainty analyses
2. Employ Monte Carlo approach to improve prediction uncertainty
3. Use water-budget approach to evaluate effects to riparian areas

Our evaluation of these additional modeling tasks is presented below.

1. Storage Values

In regard to increasing the range of storage values used in the models, the USGS suggested that specific yield could be varied by an order of magnitude and specific storage by three orders of magnitude.

The model files supplied to USFS by Montgomery and Associates (M&A) include sensitivity runs which vary the storativity two orders of magnitude, from 10^{-8} to 10^{-6}. Kruseman and de Ridder (1994), page 23, state that storativity in confined aquifers ranges from 5×10^{-5} to 5×10^{-3}. Freeze and Cherry (1979) also give a range of 5×10^{-5} to 5×10^{-3} for storativity in confined aquifers (page 60). The presumption of these figures is that the aquifer behaves as porous media. Rutqvist and others (1998) reported storativities ranging from 9.1×10^{-9} to 3.3×10^{-7} in fractured granite aquifers of low transmissivity. It is not necessary to investigate lower storativities than the range used in the M&A model. Higher storativities are not justified as they would only serve to minimize the aerial extent of the cone of depression. In addition to the storage variation in the M&A and Tetra Tech models, the model designed by Dr. Tom Myers (2008) was included in the EIS. His storativities were on the order of 10^{-5} and with an impermeable western

boundary, his cone of depression from mining was significantly smaller than either the M&A or the Tetra Tech models. As he states in his report, "If the storage coefficients of the aquifer were significantly less than modeled herein because aquifers are significantly less fractured and yield significantly less water than assumed, the effects of this project could be spread over a larger area more quickly." This is clearly demonstrated by the M&A and Tetra Tech models, which have significantly lower storativities; by one to three orders of magnitude.

The Specific yield values were not varied much, but are low for all scenarios, ranging from 0.1 to 0.01 in alluvium and Tertiary sediments, and 0.01 for most bedrock. Specific yield for Quaternary and Tertiary basin fill sediments was doubled and halved for sensitivity analysis. These are essentially the water table aquifers and are less sensitive to drawdown from a given amount of water withdrawal. There would be little gain from varying specific yield further. While storativity can vary by orders of magnitude, specific yield cannot.

There does not appear to be any significant gains in our knowledge of the effects on riparian areas from further varying storage parameters in the Rosemont models.

2. Monte Carlo Approach

In regard to employing the Monte Carlo approach to improve prediction uncertainty the USGS suggested that because the range of possible effects on surface features is uncertain, because of limited knowledge of the hydrologic system, a Monte Carlo analysis of model parameters could be used to generate a range of potential predictions that effectively identifies uncertainty in the groundwater system.

There are many approaches to evaluate prediction uncertainties. Refsgaard and others (2007) describe the Monte Carlo statistical method as one of fourteen potential methods. They give the advantages and disadvantages of each methodology. For the Monte Carlo method they state that "The advantage of Monte Carlo analysis is its general applicability . . . ," but also that "The key limitation is the large run times for computationally intensive models and the huge amount of outputs that are not always straightforward to analyze." Refsgaard and others (2007) also describe the method of Sensitivity Analysis (SA), for which they state that "The strength of SA is that it provides insight in the potential influence of all sorts of changes in input and helps discrimination across parameters according to their importance for the accuracy of the outcome. A limitation is the tendency of SA to yield an overload of information. Furthermore, SA most often takes the model structure and system boundaries for granted." They also include a table (Table 4, page 1553) that ranks the various methods of uncertainty analysis by their diagnostic abilities, and Monte Carlo and Sensitivity Analysis both rank in the same category of comprehensive analyses; i.e., they are treated as roughly equivalent.

The bottom line is that the method used in the Rosemont modeling; Sensitivity Analysis, is a rigorous and acceptable technique for evaluating uncertainty. There does not appear to be anything gained by performing further uncertainty analyses, including the Monte Carlo method. A Monte Carlo analysis is not a trivial task and the results probably would not change the overall conclusions that have already been established.

3. Water-Budget Approach

In regard to using a water-budget approach to evaluate effects to riparian areas USGS suggested that by examining water-budgets along with the current drawdown analysis and adding appropriate boundaries, the potential change in discharge to springs and streams can be represented.

Riparian areas are affected directly by changes in the position of the water table (Shafroth and others, 2000). They state that "The need for high water tables (often <1.5 m from the ground surface) for successful seedling establishment of woody riparian plants has been observed at numerous sites . . ." Groundwater fluxes are generally important, as indicated by the USGS, but for the purposes of evaluating effects to riparian vegetation, it is the vertical position of the water table and changes to it that are important with respect to root depth. Stromberg and others (1996) state clearly that water table declines in Arizona threaten riparian ecosystems. Although it would be difficult to use the model to make predictions of percentage effects to riparian environment, drawdown contours in the vicinity of riparian indicate that impacts are possible or likely. That may be as accurate as we can get. Adding groundwater flux information would not improve the prediction of impacts.

Other mining related modeling efforts have used stream depletion values to assess the effects of drawdown to streams, but have retreated from the quantitative use of results of this method due to the inherent uncertainties in the absolute values reported by the models. Recently the Rock Creek Mine in MT used this method however the conclusions by the modelers (Hydrometrics, Inc. 2014), third party experts (AquaResource 2014), and the SEIS writers was that the model output quantifying depletions from the tributary drainages could not be verified; therefore the data should not be used to quantify changes in base flow at specific locations. In addition, using the output data for quantifying stream depletion was deemed to be beyond the capabilities of the model. As a result the Rock Creek SEIS preparers used the modeled results to conduct a qualitative analysis at the sub-basin level of potential changes in water quantity from the proposed mine development. This qualitative analysis will then be used to help describe the potential impacts to aquatic resources. This approach is recommended by the modelers and supported by expert reviewers.

While the use of water budgets may have some value, it probably would not change the overall conclusions that have already been established or, significantly decrease the uncertainties inherent in this modeling effort.

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